EPA Region 7 TMDL Review

TMDL ID: IA 02-CED-0432 **State:** IA
Document Name: MIDDLE FORK SOUTH BEAVER

Basin(s): CEDAR RIVER
HUC(s): 07080205
Water body(ies): MIDDLE FK S. BEAVER CREEK
Tributary(ies): NORTH FORK SOUTH BEAVER CREEK, UNNAMED TRIBUTARIES
Pollutant(s): PHOSPHORUS, SILTATION

Submittal Date: 8/28/2007 **Approved:** Yes

Submittal Letter

State submittal letter indicates final Total Maximum Daily Load(s) (TMDL) for specific pollutant(s)/water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act [40 CFR § 130.7(c)(1)]. Include date submitted letter was received by EPA, date of receipt of any revisions, and the date of original approval if submittal is a phase II TMDL.

A letter dated August 24, 2007, and received by EPA on August 28, 2007, formally submitted this document for review and approval. Supplemental information was received via email on September 21, 2007.

Water Quality Standards Attainment

The water body's loading capacity (LC) for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards (WQS) [40 CFR § 130.7(c)(1)]. A statement that WQS will be attained is made.

The pollutant is defined through the use of a Stressor Identification (SI) study as excessive sediment and phosphorus. These pollutants have caused a chronic biological impairment in the stream, violating the Warmwater Aquatic Life (B) use. The LC for sediment is 2,580 tons/year and 17,921 pounds/year for phosphorus. EPA agrees the LC will result in attainment of water quality standards.

Numeric Target(s)

Submittal describes applicable WQS, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

The Iowa WQS list the designated uses for Middle Fork South Beaver Creek as Primary Contact Recreation (A) and Warmwater Aquatic Life (B). Middle Fork South Beaver Creek was first listed on Iowa's impaired waters list in 1998 for non-supporting, aquatic life. The 2004 §303(d) list impairment was for nutrients. An SI was used to link sediment and phosphorus to the biological target. The State of Iowa does not have a numeric standard for sediment (siltation) or phosphorus in lakes or rivers. Therefore, information on the degree of streambed siltation is used to set targets for

sediment loading reductions. Phosphorus is linked to dissolved oxygen in the stream through excessive plant growth and respiration to meet the state WQS for dissolved oxygen in Warmwater Aquatic Life (B) water bodies. EPA agrees that this serves as an appropriate translator for the narrative WQS.

Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety (MOS) that do not exceed the LC. If submittal is a phase II TMDL there are refined relationships linking the load to WQS attainment. If there is an increase in the TMDL there is a refined relationship specified to validate the increase in TMDL (either load allocation (LA) or waste load allocation (WLA)). This section will compare and validate the change in targeted load between the versions.

An SI was performed to determine the specific causes of impairment. A reference stream approach was used to target the average siltation/sedimentation rate for the streambed from its current level to that of the 75th percentile of data for reference streams in the Iowan Surface Ecoregion, 19% silt, which translates to a 59% reduction in sediment load. The reduction result is a LC of 2,580 tons/year.

Phosphorus targets were set by determining the phosphorus load which would result in meeting dissolved oxygen WQS. The target, 0.12 mg/L, was determined using the median of six different methodologies (concentration range of 0.08 – 0.19 mg/L) and resulted in a LC of 17,921 pounds/year. This will require a reduction of 40% in phosphorus load. Explanation of the methodologies is included in the submittal.

EPA agrees with the analytical analysis of the SI in setting the surrogate pollutants that are targeted in this TMDL.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, nonpoint and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered. If this is a phase II TMDL any new sources or removed sources will be specified and explained.

Sediment is delivered to the stream during rain events from nonpoint sources throughout the watershed. Sheet and rill erosion occurring in agriculture fields represent about 99% of the load and is the overwhelming dominant source of sediment in the creek. For sediment, maximum daily loads from point sources were calculated based on permit TSS limits and design flow, resulting in 0.4 tons, and an annual sediment load of 146 tons. The total existing load of sediment is 6,921 tons/year.

Phosphorus is delivered to the stream using both point source discharges as well as nonpoint sources. The only permitted point source in the watershed is the Ackley wastewater treatment plant (IA0035297). Nonpoint sources include surface runoff/tile flow, illicit or failing household septic systems, and cattle in streams. Phosphorus loads to Middle Fork South Beaver Creek are estimated to be 29,868 pounds/year or 81.8 pounds/day on average.

EPA considers the source analysis to be complete.

Allocation - Loading Capacity

Submittal identifies appropriate WLA for point, and load allocations for nonpoint sources. If no point sources are present the WLA is stated as zero. If no nonpoint sources are present, the LA is stated as zero [40 CFR § 130.2(i)]. If this is a phase II TMDL the change in LC will be documented in this section.

For sediment, the LCis 2,580 tons/year, equating to a daily average of 7.0 tons/day, with a daily maximum of 487 tons, determined using a statistical dataset derived from estimates of annual sediment loading and daily rainfall.

For phosphorus, the LC is 17,921 pounds/year, equating to a daily average of 49.1 pounds/day with a daily maximum of 142 pounds.

EPA agrees with the calculated LC.

WLA Comment

Submittal lists individual WLAs for each identified point source [40 CFR § 130.2(h)]. If a WLA is not assigned it must be shown that the discharge does not cause or contribute to WQS excursions, the source is contained in a general permit addressed by the TMDL, or extenuating circumstances exist which prevent assignment of individual WLAs. Any such exceptions must be explained to a satisfactory degree. If a WLA of zero is assigned to any facility it must be stated as such [40 CFR § 130.2(i)]. If this is a phase II TMDL any differences in phase I and phase II WLAs will be documented in this section.

The WLA for this TMDL is set at the existing level of 146 tons/year of sediment with a daily maximum of 0.4 tons/day. Presently the only point source in the watershed is Ackley WWTP (IA0035297).

The total phosphorus WLA is 4,855 pounds/year, equating to a daily average of 13.3 pounds/day, with a daily maximum of 32.9 pounds/day. Presently the only point source in the watershed is Ackley WWTP (IA0035297).

EPA agrees with the calculated watershed WLA.

LA Comment

Includes all nonpoint sources loads, natural background, and potential for future growth. If no nonpoint sources are identified the LA must be given as zero [40 CFR § 130.2(g)]. If this is a phase II TMDL any differences in phase I and phase II LAs will be documented in this section.

The LA for sediment is 2,434 tons/year equating to a daily maximum of 487 tons/day.

The LA for total phosphorus is 13,066 pounds/year, equating to a daily maximum of 204.1 pounds/day.

EPA agrees with the calculated LA.

Margin of Safety

Submittal describes explicit and/or implicit MOS for each pollutant [40 CFR § 130.7(c)(1)]. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided. If this is a phase II TMDL any differences in MOS will be documented in this section.

Estimates of long term sediment and phosphorus loading were based on the absence of existing conservation practices which provides an implicit MOS by overestimating the present load and calculating required percent reductions from a worst case scenario. EPA agrees the conservative calculation of present load is an implicit MOS.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL (s) [40 CFR § 130.7(c)(1)]. Critical conditions are factors such as flow or temperature which may lead to the excursion of WQS. If this is a phase II TMDL any differences in conditions will be documented in this

section.

Critical or seasonal environmental conditions do not apply for sediment/siltation. Siltation/sedimentation poses long-term, chronic threats for aquatic life and as such do not warrant consideration for acute seasonal impacts.

Total phosphorus is expressed as annual loading. Critical environmental conditions occur in late summer and early fall when stream discharge is low and warm weather persists and excessive algal growth is encouraged and can have a dramatic effect on in-stream dissolved oxygen concentrations due to low flow conditions. In late summer, plant growth in the stream leading up to these critical conditions occurs throughout the growing season.

EPA agrees the submittal has taken into account any significant effects of seasonality or critical conditions in the calculation of the LC, WLA, LA, and MOS.

Public Participation

Submittal describes required public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s) [40 CFR § 130.7(c)(1)(ii)].

During TMDL development input was solicited from all stakeholders. Initial notice of the TMDL was given out a city council meeting in the city of Ackley on July 12,2004. A final public meeting was held on August 7, 2007 and attended by local city officials, NRCS, local citizens and landowners, and one member of the media. No public comments were received.

EPA concludes the submittal includes evidence of meaningful public participation.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies a monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used) [40 CFR § 130.7].

Monitoring strategies are defined in the document as well as locations for various types of monitoring, (chemical, biological, and physical). Monitoring is acknowledged as a critical element in assessing the stream and tracking the effectiveness of implementation of the TMDL. The TMDL is written as a watershed improvement plan to target watershed based implementation, including sampling, by watershed groups.

EPA agrees a comprehensive monitoring plan has been included in the submittal.

Reasonable Assurance

Reasonable assurance only applies when less stringent WLAs are assigned based on the assumption of nonpoint source reductions in the LA will be met [40 CFR § 130.2(i)]. This section can also contain statements made by the state concerning the state's authority to control pollutant loads.

All WLAs will be implemented under the NPDES permitting program for point source dischargers. EPA concludes reasonable assurance is not required since increased reductions in nonpoint source loads are not being required in lieu of less stringent WLAs.